

REMARKS

Summary of the Office Action

In the Office Action, the drawings stand objected to.

Claim 1 stands rejected under 35 U.S.C. 112, 1st and 2nd Paragraphs.

Claim 1 stands rejected under 35 U.S.C. 103 (a), as being unpatentable over U.S. Patent Nos. 5,280,509 to *Py* and 3,607,630 to *West*.

Claim 1 stands rejected under 35 U.S.C. 103 (a), as being unpatentable over *Py* in view of *West*, and further in view of newly cited U.S. Patent No. 5,812,623 to *Holden*.

Summary of the Response to the Office Action

Applicant proposes amending claim 1 as shown above, and substituting Figs. 1 and 2 as shown in the concurrently filed Request for Approval of Drawing Changes. Accordingly, claim 1 is pending for further consideration.

Objection to the Drawings

In the Office Action, the drawings stand objected to.

As required in the Office Action, Figs. 1 and 2 have been amended to disclose the open ends of the vertical pipes and the conventional dovetail joint which connects the horizontal and vertical pipes. Fig. 1 is a sectional view of the ex-vessel core melt retention device consisting of horizontal and vertical pipes, connection part being in the form of a conventional dovetail joint and a flow supply system according to the present invention. Fig. 2 is a plan view of the ex-vessel core melt retention device.

Accordingly, Applicant respectfully requests withdrawal of the objection to the drawings.

Rejection under 35 U.S.C. 112, 1st and 2nd Paragraphs

Claim 1 stands rejected under 35 U.S.C. 112, 1st and 2nd Paragraphs.

Applicant proposes amending claim 1 and the drawings, as shown above, to address the concerns raised in the Office Action. These amendments have been made solely for the purpose of correcting typographical errors and other informalities, and not for purposes related to patentability.

Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. 112, 1st and 2nd Paragraph, rejection of claim 1.

All Claims are Allowable

In the Office Action, claim 1 stands rejected under 35 U.S.C. 103 (a), as being unpatentable over U.S. Patent Nos. 5,280,509 to *Py* and 3,607,630 to *West*. Claim 1 stands rejected under 35 U.S.C. 103 (a), as being unpatentable over *Py* in view of *West*, and further in view of newly cited U.S. Patent No. 5,812,623 to *Holden*. Applicant traverses this rejection for the following reasons.

With regard to independent claim 1, Applicant respectfully asserts that *Py*, *West* and *Holden*, viewed either singly or in combination, do not teach or suggest an ex-vessel core melt retention device including, at least, “horizontal jacket pipes located on a water supply part, the horizontal jacket pipes having water inlets A formed at their lower half, the water inlets including a series of holes and allowing water to enter the bottom of the pipes; vertical pipes connected at both ends of the horizontal jacket pipes in the form of a conventional dovetail joint to communicate with each other, the vertical pipes including open ends to permit water vapor to escape therethrough; and said water supply part including a series of cooling channels engraved into a cavity floor located at the lower half of the horizontal jacket pipes for allowing water to enter from the holes at the lower half of the horizontal jacket pipes,” as recited in independent claim 1, as amended.

Support for these features recited in claim 1 can be found at least on page 4, line 19 to page 5, line 13 of the originally filed specification, and in Figs. 1 and 2 of the drawings. Specifically, referring to Figs. 1 and 2, the present invention discloses an ex-vessel core melt

retention device including horizontal jacket pipes 110 located on a water supply part. Horizontal jacket pipes 110 include water inlets formed at their lower half. The water inlets include a series of holes 111 which allow water 114 to enter the bottom of pipes 110. As shown in Fig. 1, the retention device further includes vertical pipes 130 connected at both ends of the horizontal jacket pipes 110 in the form of a conventional dovetail joint 112 for allowing pipes 110 and 130 to communicate with each other. Vertical pipes 130 include open ends 113 to permit water vapor to escape therethrough. As shown in Figs. 1 and 2, the water supply part includes a series of cooling channels 220 engraved in a cavity floor 200 located at the lower half of horizontal jacket pipes 110 for allowing water 114 to enter from holes 111.

The Office Action cites *Py, West and Holden* as teaching or suggesting the invention recited in claim 1 of the present invention.

Specifically, as shown in Figs. 3-5 of *Py*, *Py* discloses a device 11 for cooling and protecting vessel 3. Device 11 includes channels 20 and collector assemblies 21 and 22 (designated horizontal jacket pipes in Office Action), which form a closed loop and facilitate the supply and removal of cooling and heated fluid to channels 20, (Col. 4:31-36). *Py* further discloses vertical pipes 12 and 13 for supplying and removing cooled and heated water, (Col. 4:1-7).

Contrary to the teachings of *Py*, the present invention discloses an ex-vessel core melt retention device including shallow water channels 220 engraved into the cavity floor in which the horizontal jacket pipes 110 are installed. Moreover, engraved water channels 220 run crosswise to pipes 110. Thus any water 114 available from a nuclear power plant can be flooded onto the top of the concrete layer 230 over the horizontal jacket pipes 110. *Py* on the other hand discloses a conventional reservoir, and not “horizontal jacket pipes located on a water supply part,” or the “water supply part including a series of cooling channels engraved into a cavity floor,” as recited in claim 1, as amended. Instead, as shown in Figs. 1-4 of *Py*, the collector assemblies 21 and 22 (designated horizontal jacket pipes in Office Action) are located on the sides of channels 20. *Py* also does not teach or suggest, “the vertical pipes including open ends

to permit water vapor to escape therethrough,” or the cooling channels being “located at the lower half of the horizontal jacket pipes for allowing water to enter from the holes at the lower half of the horizontal jacket pipes,” as recited in claim 1, as amended.

Additionally, contrary to the present invention, the collector assemblies 21 and 22 (designated horizontal jacket pipes in Office Action) and vertical pipes 12 and 13 of *Py* do not make a closed cooling circuit. For example, horizontal jacket pipes 110 of the present invention consist of a series of pipes contacting each other and not connected with the water supply part. On the contrary, as shown in Figs. 3 and 4 of *Py*, *Py*’s collector assembly 21, 22 is connected with channels 20 with no unique and passive water channels 220 being engraved into the cavity floor 200.

With regard to the teachings of *West*, *West* discloses a water-cooled metal basin including storage tank 40 for supplying water through inlet header 34 via riser 38 and cold water trap 39, (Col. 3:56-57). As shown in Figs. 1 and 5 of *West*, inlet header 34 provides water to cooling tubes 32. Tubes 32, which include upturned portions at each end thereof, are connected to inlet header 34 at a first upturned portion and outlet header 36 at a second upturned portion, (Col. 3:4043). Accordingly, water circulates only inside tubes 32 for the invention of *West*.

On the contrary, for the present invention, water 114 is flooded over the concrete layer 230 in order to protect against direct ablation caused by the melt and against damage caused by loads from the interaction between nuclear fuel and water. Contrary to the disclosure of *West*, the concrete layer 230 for the present invention covers the horizontal jacket pipes 110 and the water supply part running crosswise to the horizontal pipes. Moreover, as shown in Fig. 2 of the present invention, water flooded on the concrete layer 230 can enter the gap between the cavity wall 210 and the end side of the series of horizontal jacket pipes 110, and flow down by gravity to the shallow water channels 220. Thus, for the present invention, there is no need for an additional water reserving tank and complicated pipe routing for water circulation, as disclosed for the invention of *West*.

Moreover, as shown in Fig. 8 of *West*, water and steam flowing through pipe 44 are separated inside a steam-separating device (51) and water enters tank 4 through pipe 52. On the contrary, for the present invention, steam is directly released from the open ends 113 of the vertical pipes and water is not re-circulated. This steam for the present invention can be condensed into water by water spray. In any case, *West* does not teach or suggest, "the vertical pipes including open ends to permit water vapor to escape therethrough," as recited in claim 1, as amended. Moreover, *West* also does not teach or suggest the cooling channels being "located at the lower half of the horizontal jacket pipes for allowing water to enter from the holes at the lower half of the horizontal jacket pipes," as recited in claim 1, as amended.

With regard to the teachings of *Holden*, Applicant respectfully asserts that *Holden*, which has been cited for disclosing dovetail connections, does not teach or suggest at least the aforementioned features distinguished over the teachings of *Py* and *West*.

Accordingly, Applicant respectfully asserts that any combination of *Py*, *West* and *Holden* would fail to teach or suggest an ex-vessel core melt retention device including, at least, "horizontal jacket pipes located on a water supply part, the horizontal jacket pipes having water inlets A formed at their lower half, the water inlets including a series of holes and allowing water to enter the bottom of the pipes; vertical pipes connected at both ends of the horizontal jacket pipes in the form of a conventional dovetail joint to communicate with each other, the vertical pipes including open ends to permit water vapor to escape therethrough; and said water supply part including a series of cooling channels engraved into a cavity floor located at the lower half of the horizontal jacket pipes for allowing water to enter from the holes at the lower half of the horizontal jacket pipes," as recited in independent claim 1, as amended.

As pointed out in M.P.E.P. § 2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claimed limitations must be taught or suggested by the prior art". *In re Royka*, 409 F.2d 981, 180 USPQ 580 (CCPA 1974). Since this criterion has clearly not been met, Applicant respectfully asserts that the rejection under 35 U.S.C. § 103 (a) should be

withdrawn because *Py*, *West* and *Holden* clearly do not teach or suggest each feature of independent claim 1.

In view of the above arguments, Applicant respectfully requests the rejection of independent claim 1 under 35 U.S.C. § 103 be withdrawn.

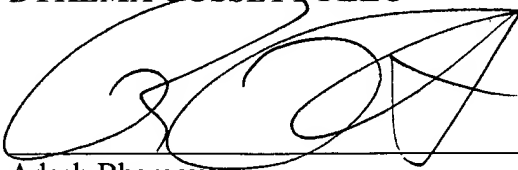
CONCLUSION

In view of the foregoing, Applicant respectfully requests the entry of this Amendment to place the application in clear condition for allowance or, in the alternative, in better form for appeal. Applicant also requests the Examiner's reconsideration and reexamination of the application and the timely allowance of the pending claims. Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicant's undersigned representative to expedite prosecution.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 04-2223. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

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